



Missouri
Department of
Natural Resources

WATER QUALITY COORDINATING COMMITTEE

Lewis & Clark State Office Building
LaCharrette Conference Room
1101 Riverside Drive
Jefferson City, Missouri

March 18, 2014

10:00 a.m.

MEETING AGENDA

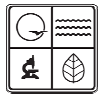
Necessary Layers for Modeling to Determine Critical Watershed Areas,
Nayereh Ghazanfarpour, UMC Extension

Developing a Nine Element Plan Using Modeling and Communication,
Bob Broz, UMC Extension

Other

Agency Activities

Meetings & Conferences



MISSOURI WATER QUALITY COORDINATING COMMITTEE

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MINUTES

Attendees:

Nayerreh Ghazanfarpour	University of MO Extension	Caroline Toole	Lake Ozarks Watershed Alliance
Greg Anderson	DNR, Water Protection Program	Drew Holt	Elk/Shoal Crk/Grand Lake Watersheds
John Johnson	DNR, Water Protection Program	Derrick Steen	Barr Engineering/MO Corn Growers
Jane Davis	DNR, Water Protection Program	Kirk Lambrecht	DNR, Water Protection Program
Mike Kruse	DNR, Water Protection Program	Ken Struemp	DNR, Soil & Water Conservation Pgm
Anna Nowack	DNR, Water Protection Program	Robert Brundage	Newman Comley & Ruth
Bob Broz	University of MO Extension	Becky Cripe	DNR, Water Protection Program
Donna Swall	Lake Ozarks Watershed Alliance	Darlene Schaben	DNR, Water Protection Program

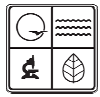
Greg Anderson chaired the meeting.

Introductions were made.

Evaluation of Water Quality and Best Management Practices in the Black Creek Watershed Using the SWAT Model, Nayerreh Ghazanfarpour, UMC Extension
PowerPoint Presentation

Nayerreh explained that a watershed, or catchment, is a topographically delineated area drained by a stream system; that is, the total land area above some point on a stream or river that drains past that point. Watershed management is the process of organizing and guiding land and other resource uses on a watershed to provide desired goods and services without adversely affecting soil and water resources. Watershed management practices are those changes in land use, vegetative cover, and other nonstructural and structural actions taken on a watershed to achieve watershed management objectives. The Black Creek Watershed Management Plan (WMP) has been developed and needs to be revised to include the latest information, as well as address new strategies and define new partnerships between watershed stakeholders. Runoff from agricultural lands is believed to be responsible for elevated nutrient and sediment levels. The Soil and Water Assessment Tool (SWAT) model was selected to study the watershed. The objectives were to accurately and efficiently quantify sediment and nutrient (nitrate-nitrogen, phosphorus) losses from the watershed; to identify and prioritize critical sub-watersheds and to evaluate the relative importance of managing them; and to evaluate the effectiveness of alternative best management practices (BMPs) at reducing pollutant loads from the Black Creek watershed. To achieve these objectives Nayerreh said they followed a watershed analysis process—data analysis; model development and calibration; baseline analysis; and BMPs evaluation.

The ArcSWAT 2012 version was used. To prepare the model, they developed several map layers and data including: topography map; soil map and land use map; selecting a weather station; land use management data; stream water quality; calibration and validation; and to produce model outputs.



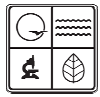
The study area is located in the northeast part of the state in Shelby County, covering 53.9 sq. miles (34,484 acres), which includes Black Creek, a tributary of the North Fork of the Salt River, a part of the Mark Twain Lake Watershed. Nayereh showed slides of the different layers needed for the model and talked about the purpose and use of each. One of the layers needed is a Digital Elevation Model of the Black Creek Watershed. To permit some flexibility for model calibration as well as in making modifications to management scheduling and targeting alternative management practices, the watershed was divided into 19 subwatersheds. Subwatersheds are the main units used in SWAT to summarize load results and to determine target BMP areas. Other layers needed are a slope map, land use map, and soils data to create Hydrologic Response Units (HRUs). Modeling accuracy increases when subwatersheds are modeled with multiple HRUs. The Shelby National Weather Service cooperative weather station was used in the analysis. They also needed the cropping and management information, as well as pasture management. For the model calibration, when data are available, it is always best to compare the simulated values data obtained during a given numbers of years to measured data during that time and adjust the model parameters so that they match. For model validation, simulated values and measured data are then compared for a different period of time not used for the model calibration. In reality, the data are rarely available and the model is calibrated, validated, or simply verified with what is available. Several years of observed data is needed in order to compare their model results. USGS data was used for stream flow and water quality. Nayereh showed a flow chart of the input data, processing and display, and the result. She showed charts of calibration and validation of stream flow, sediment yield, total nitrogen, and total phosphorus. She talked about the difference of what was observed data versus the simulated data to see how close it was. If there was a big difference, minor adjustments were made to some parameter values. Nayereh show maps for the time period of 2000-2010 of the annual average for sediment, total nitrogen, and total phosphorus, and talked about some of the results.

Now that they have figured out which subwatersheds are the critical areas, they can use scenarios to see which practices will improve the areas. Nayereh said they modeled those areas using no-till best management practices, nutrient management, filter strips, terracing, cover crops, reduced tillage, stream exclusion, woodland protection, and inter-seeding. She showed a chart of results for annual sediment, nitrogen, and phosphorus loadings using each of the BMP scenarios and which BMP showed the greatest reduction. This will allow them to recommend which BMP is the most effective to reduce the load on the stream in the critical areas.

Developing a Nine Element Plan Using Modeling and Communication, Bob Broz, UMC Extension PowerPoint Presentation

Black Creek was originally listed for nutrients and sediment, then later for bacteria. By using modeling it becomes easier to identify specific areas within the watershed that are heavy contributors and helps to focus on what BMPs would be most effective at reducing load in these areas. Bob said that modeling is nice but, in reality, they need to determine what percent of the landowners are willing to do what BMPs. Maps produced by the model provides a visual image that landowners can see and helps them understand the need for increased implementation of practices.

Almost every component of a nine-element plan can be affected by the information provided by the modeler. The information from the model helps to identify the education component, verifies sources of pollution, and helps determine technical and financial assistance needed. A key component is getting the right information to input into the model. Data is rarely available so calibration and validation of the model must be done by working with the local agency and landowners. Bob said it's important to talk with local producers to understand what they are willing to do. In Black Creek they are trying to find an alternative from terracing. They work with local agency people to verify information and field truth the information. It's very important to involve the local people and landowners in developing a watershed plan. Bob said the first two watershed plans were written by NRCS for Concordia and Higginsville but never presented to local citizens; therefore, these plans were never implemented. The model should quantify levels of nutrient and sediment in the watershed; identify critical subwatersheds; help prioritize critical subwatersheds; and assist with evaluating the effectiveness of different BMPs at reducing



pollutant loads. An Hydrologic Response Unit (HRU) says that certain characteristics (slope, weather, land use cover, type of soil, etc.) were reviewed to determine how many areas within the watershed have the same characteristics in the same perimeter that will get the same response using the same practice. HRUs are important so you don't have to test every part of the watershed.

Black Creek watershed has approx. 34,504 acres with 230 producers within the watershed. The HRUs help identify how areas that are similar in soil type, slope and land cover contribute sediment and nutrients, to know the best practices to use. By combining layers that show the load potential from the HRUs for sediment, nitrogen and phosphorus, those areas can be identified that will provide the largest percentage of load. This can help prioritize areas that should receive funding for BMPs and should provide the greatest improvement by implementing these BMPs. SWCDs have a system of first come-first served so when funding becomes available it is then given to the next producer on the list. Bob felt this mentality needed to change. By using the list of priority areas and talking with producers, the practices may have a better chance of getting on the ground and giving the greatest improvement for the least amount of money. Bob said this is where Section 319 funding could also be used to assist with BMP implementation.

Modeling can't answer all the questions. It will still take a large amount of time to work with the general public; identify what local watershed citizens are willing to do; learn where previous BMPs are located; and recognize the limitations of the model. The next step would be to introduce the plan at public meetings. Citizens would like to see a map of the area; see what things have already been done. Bob said at the meeting they could get input from local landowners on acceptable BMPs and farming systems, and demonstrate how things can improve by following the recommendations from the model.

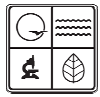
Benefits of the modeling for local SWCDs, NRCS & Extension include writing the area's plan of work, identify major concerns, identify BMPs that should reduce load, establish an estimate of amount of funding needed, establish estimate of technical assistance needed, establish need for educational programs that match BMP selection, and get the biggest return on investment. The watershed plan based on the model should provide: a roadmap of where you want to be and how you plan to get there; it identifies the area, the potential practices, and the educational programs to provide understanding; it allows you to budget your time and funds to get BMPs in place; and demonstrates to funding agencies that the process is well thought out and prioritized to meet economic and environmental goals.

Benefit for local producers include: demonstrates a care for the land; reduce loss of nutrients, soil and pesticides; increases overall profitability of farms; increases value of the land; and leaves a legacy for the future.

In answer to a question, Bob said several producers sign up to do the cover crop practices. This reduces the need for application of nitrogen and controls sedimentation. Cover crops take very good management though.

Bob said they just received review comments from the Nonpoint Source Unit on the Black Creek Watershed Management Plan. They have other information to be incorporated yet. The person writing the plan is doing the best he can with Bob assisting where he can. In response to a question, Bob said the best approach to present a plan or idea is to have local people (SWCD, NRCS, Extension) set everything up and lead the meeting. Still, not everyone will agree.

Greg Anderson added that there are lessons to be learned in regard to watershed planning. The money available for environmental funding continues to decline so we need to find critical areas to place the funding. The goal is clean water. Nonpoint source projects have spent a lot of money on monitoring with little results shown. Greg said they can use existing monitoring to tell if there are noticeable changes in the water quality. They look for



options and improvements. John Johnson said for the Spring River Watershed Management Plan, the public meetings are with the landowners to keep them informed and involved throughout the process. John feels this will help with implementation of the plan.

Agency Activities

Becky Cripe said as a new 319 project manager she has 6-7 subgrants. One of her new projects is with the Watershed Committee of the Ozarks for a project entitled Little Sac Restoration. Another project is with Lake of the Ozarks Watershed Alliance. They recently had a successful workshop on their Living Wall Demonstration. She is also now the Exchange Network coordinator, working with Information Technology (IT) staff on data exchange flow of various programs within the Department to submit data to EPA.

Ken Struempf said there is a Nutrient Reduction Strategy meeting on March 20. The Soil and Water Districts Commission meeting is March 21. This year they plan to spend between \$24-25 million. The obligations are down this year; may be because of the drought.

Kirk Lambrecht said the 303(d) list is finalized and planning to submit it to the Clean Water Commission at their April 2 meeting. They are working to finalize the Listing Methodology Document. The Integrated Water Quality Report should be finalized within a week or two.

Derrick Steen asked the group to let him know if the Missouri Corn Growers Association can be of assistance in any projects.

Caroline Toole mentioned they are planning the second round of a 20-week monitoring this summer. During this same time they plan to pick a cove serviced by onsite septic systems and pump-out all the septic tanks for the whole cove. They will then continue the monitoring and see if there are any changes to the parameters in the cove.

Donna Swall said they have a lot of stakeholder buy-in, both business and homeowner. They have well over 100 projects on the ground. They are looking for more grant money to keep the projects going. They have one grant ending this year.

Bob Broz said the UMC's College of Agriculture, Food, and Natural Resources has started a Water Center. Jason Hubbard will be responsible for it. This is patterned from a project in Ohio so they should be able to bring in the right people to do the modeling, and for some of the research. Let Bob know if you need contact information for Dr. Hubbard. Other meetings Bob mentioned: March 25 - Black Creek meeting to discuss next steps to move forward on the plan; April 17 - Hazel Creek meeting in Kirksville.

John Johnson has been working on WMPs with Black Creek and Spring River projects. The Black Creek project requested an extension in order to plan a meeting with landowners to get public buy-in. The plan is expected to be completed by August. Spring River's WMP should be completed this year. They had two public meeting with two more scheduled. They will next focus on the urban BMPs and educational activities to implement the plan. This plan should be completed by February. Other projects John is working on are a South Creek Restoration project with the city of Springfield and a Phase 3 Deer Creek Watershed Initiative project with MO Botanical Garden.

Nayereh Ghazanfarpour said she was working on a project using a web model for soil erosion. These results will be compared with an APEX model.

Meeting adjourned.